The Indigenous Vegetation of Lithuania

A. Place in World Forest Zones

1. The soil and climatic conditions of Lithuania and the other factors which influence vegetation all tend toward the growth of forests.(1) Lithuania occupies a place in the temperate forest zone(2) and belongs in the sub-zone of mixed coniferous and broad leaf trees.(3) /Sketch #8, "Europe Vegetation", see end of report for availability./ English oak (Quercus pedunculata) and Norway Spruce (Picea excelsa) are typical of this zone and are found in Lithuania. In natural reforestation of large, deforested areas soft-deciduous forests (aspen, birch, hoary alder, etc) are formed first followed by permanent mixed coniferous forests.

2. The temperate forest zone (including Lithuania) is suitable for agriculture. For this reason, most of the zone has been deforested and the chief areas remaining under forest cover are those less suitable for agriculture.

B. Indigenous Trees and Bushes

Lithuania counts 26 types of trees and 31 types of bushes growing naturally within its boundaries.(4) Only a few of these, however, are important in the establishment of forests. These include:

1. Permanent forest builders

(a) Scotch Pine	(Pinus Sylvestris) (L)
(b) Norway Spruce	(Picea Excelsa) (Link)
(c) Northern Alder	(Alnus Glutinosa) (Gaerth)
(d) English Oak	(Quercus Pedunculata Ehrh or Quercus Robur-L)

2. Temporary forest builders

(a) European Birch	(Betula Verrucosa) (Ehrh) and (Betula Pubescens) (Ehrh)
(b) European Aspen	(Populus Tremula)
(c) Hoary Alder	(Alnus Incana) (Moench)

3. Bushes

(a) Coniferous
Common Juniper (Juniperus Communis) (L)
(b) Deciduous
(1) European Hazelnut (Coryllus Avelana) (L)
(2) European Fly (Lonicera Xylosteum) (L)
(3) European Cornels (Cornus Mas) (L)
(Cornus Sanguinea) (L)
(4) European Spindle Trees (Evonymus Verucosa) (L)
(5) European Spindle Trees (" Europea) (L)
(6) European Raspberry (Rubus Idaeus) (L)

C. Properties of the Most Common Trees

1. The common Scotch Pine /see end of report for availability of photograph/ is a handsome evergreen which grows to 40 or 50 meters in height and 70 to 80 cm in thickness at a height of at least 1.3 meters from the earth. (All dimensions are given for the largest of the species growing under the most favorable conditions.) In peat bogs its growth is limited to not over four meters and not over 20 cm in diameter. The trunk is straight and the few branches are ordered in conspicuously regular whorls.

The upper bark is orange and paper-thin; the lower bark is reddish gray; the crown is light and cone-like in youth, and umbrella-like in age. The Scotch pine is intolerant to shade. Self-cleaning of the lower branches is good. It is tolerant to soil quality and can grow on all types of soils, even in peat bogs with extremely poor mineral content. On loams and clays, the Scotch pine is usually replaced by other types of trees which are more tolerant to shade. The Scotch pine can withstand the worst droughts and will grow on dry sandy soil. Its root system is well developed and the tree will grow well in exposed places, such as sea shores, without being uprooted. The roots grow to such a depth that the Scotch pine can exploit the deeper portions of the soil. Its life span lasts up to 300 years but the yearly increment of wood growth is small. The tree is ordinarily allowed to grow for 100-160 years in cultivated forests. It reaches maturity (the first flowering) in 15-20 years in open areas and in 50-60 years in stands. The fruit of the tree is wind pollinated and its "wingy" seeds are widely distributed by the wind. A repetitive cycle occurs every two to three years in which there is considerable cone and seed production. A strong, healthy tree produces over 100 cones with about 45-50 seeds on each cone. Sprouts do not appear when the tree is cut down but conditions in Lithuania are moderately favorable to the Scotch pine's natural reforestation. Lithuania's dry spring and hot, dry early summer are major obstacles to its natural regeneration. If not reseeded or planted, cut-over areas of Scotch pine are succeeded by temporary birch stands until the Scotch pine succeeds in regenerating itself. The wood of the Scotch pine is a valuable, durable product if it is dried properly, showing good resistance to pressure (breaking or shearing). As a result, it is very desirable for construction purposes or for export. Its value as fuel is below that of birch or northern alder but it produces naval stores products such as turpentine, tar, resin, etc. The Scotch pine primarily grew in the eastern and southeastern portions of Lithuania. It is resistant to insects and fungi except for the bark beetle (Myelophilus Piniperda Minor) if aged and two fungi Agaricus Mellus and Trametes Pini. The young plants are susceptible to Hylobius Abietis and the May Bug (Melolontha Vulgaris). The wood is subject to blue stain fungi if not entirely dried. Scotch pine forests are particularly susceptible to fire.

2. The Norway spruce is a handsome tree with a cone and a dark green crown /see end of report for availability of photograph/. It grows to a height of 40-50 meters and to 75-80 cm in diameter. Its life span reaches 200 years. The Norway spruce is very tolerant to shade and, therefore, drives other trees out of its area and forms mixed forests with deciduous trees. The tree is intolerant to poor or to moist soils. It prefers well drained loams, sandy loams, and clays. Such soils are found in the central portions of Lithuania in the central plains, and in both uplands. The root system of the Norway spruce fans out and lies close to the surface. For this reason, the tree is easily uprooted by wind storms, especially when it grows in pure Norway spruce stands, with deciduous trees which have lost their leaves, or when the soil is very wet after prolonged rains. The Norway spruce grows slowly and the young trees are sensitive to freezing temperatures, especially during vegetation periods. Natural regeneration is best when it occurs under the shelter of light deciduous trees (birch, willow, aspen, etc). Under cover of the mother-stand, regeneration is difficult and normal growth can proceed only in large open clearings. Natural regeneration is good. The trees mature in 30-40 years and are wind pollinated. An abundant seed crop in the prolonged cones occurs every 3-4 years. Like the Scotch pine, the Norway spruce does not produce sprouts when cut-down. Natural selection of the trees in a Norway spruce stand is much slower than in a Scotch pine forest. Norway spruce wood is white and light, and is used for structural beams, blocks, pier pilings, lumber, pulp wood and shingles. After Scotch pine, it is the most popular and useful wood in Lithuania. The tree is subject to the ravages of the bark beetle /Ips Typographus/ in old age, and suffers red root rot on soils which do not suit it.

3. The Northern alder is a handsome, medium sized deciduous tree, up to 30 meters high and 50 cm in diameter /see end of report for availability of photograph/. The crown is shaped in a cone, and the leaves are broadly oval, and dark green above. The bark is smooth and grayish brown in color with pale gray horizontal markings. The tree's life span reaches 150 years and maturity is at 15 years. Seeds are produced annually. The small, 2 mm oval seeds float readily and thus, reforestation of the Northern alder is easy. When the trees are cut, sprouts appear which grow in nests of 3-4 each. Growth is very fast, especially from sprouts which can grow to 20 meters in height within 30 years. The Northern alder prefers moist, fertile soils, and does not do well in standing soil waters or dry soils. It does not endure shade well and grows in rather light stands. The roots are powerful and resistant to uprooting. The tree is hardy and resistant to low winter temperatures and freezing temperatures in the spring. The tree is susceptible to rot in its wood and roots, especially if it originates from a sprout. Its soft wood is used in the production of cheap veneer plywood and cigar boxes. It is a desirable fuel. It is found largely in eastern and southern Lithuania where it forms large stands in the water sheds.

4. The English oak grows to a height of 30-40 meters and up to two meters in diameter /see end of report for availability of photograph/. The oak is a handsome tree, sometimes having a branchless trunk up to 15 meters from the ground. The crown is large and oval. There are many thick limbs and branches. The bark is gray, with shallow, short perpendicular furrows. The leaves are dark green on the upper side, paler and smoother on the under side, and consist of 9-11 lobes. The light brown acorn of the English oak is 2 - 2.5 cm long and shaped like a hemispherical cup. The tree is wind pollinated. It reaches maturity in 70-80 years and produces seed in mass every three to four years after that. The acorns are distributed by birds, squirrels, and mice; and wild boars as they root in the ground are helpful in burying the acorns. The trunk will produce sprouts if the tree is cut when 50-60 years old, but not if it is cut after that age. The life span is 900-1000 years. The tree is intolerant to shade and requires the protection of other trees. It is susceptible to freezing temperatures, and sensitive to soils, doing poorly on podzols. It grows best on loams and sandy loams and on soils which are deeply aerated and well drained. The best area in Lithuania for the English oak's growth is in the uplands, particularly in the eastern upland. The roots of the tree are very powerful, the main root growing 6-7 meters deep where the water table lies far beneath the surface. The tree is very resistant to drought and therefore, is important in the reforestation of Russian prairies. The tree grows slowly when young but faster as it matures. The wood is dark brown, hard, and resistant to pressure and breaking. Hard oak is used for heavy structures such as beams and for production of veneer and lumber where high quality wood is desired (furniture, etc). Soft oak is used for fuel and in plywood veneer production. The English oak does not form pure oak forests. If they occur it is as a result of artificial planting. Generally, the oak grows in company with the Norway spruce and with beech (Carpinus Betulus) trees. The oak occupies only a small area (about 1%) of all Lithuania's forests, and is not particularly important, but deserves attention here because of the emphasis which Soviet Lithuania places on its growth.

5. Type: European Birch

   Height: 30-35 meters

   Diameter of Trunk: 40 cm

   Prevalence: Common in Lithuania, especially on forest edges.

   Life Span: With favorable conditions, 500 years.

Description: Slender, flexible branches which droop if aged. The leaves are smooth, deep green, oval, sharply pointed, and have jagged (saw-tooth) edges. The bark grows in paper-like layers, the upper being white, the lower black with deep, chalky-colored cracks. The limbs and branches are brown with some carmine tinge. The twigs of Betula Verrucosa are verrucous, those of Betula Pubescens are smooth and woolly.

Maturity: 15 years.

Pollination: Wind, in May. Light, yellowish wingy seeds ripen in June and are distributed by wind.

Reforestation Properties: Excellent, inured to late spring frost, a pioneer tree which quickly covers abandoned meadows and farmland. If cut before age 80 the stump will sprout. The tree does not cast heavy shade and thus, Norway spruce, oak, etc, which require protection can grow in its stands. The birch is, therefore, apt to form only temporary stands when it grows on well-drained soils. The trees do not require special soils and grow equally well on dry soil or in peat bogs.

Enemies: The root system is well developed and the tree is rarely uprooted. Youthful growth is rapid. The tree is resistant to disease and insects.

Woods: Decays rapidly if not stripped of its bark. If dried and protected against the weather the wood is durable; the most durable found in Lithuania. Used for wagons, furniture, repairs and construction around farms, and most valued for use in veneers and aircraft construction. The best fuel found in Lithuania. The bark tar is useful as a medicine.

6. Type: European Aspen

Height: 30 meters plus

Diameter of Trunk: To 1.5 meters.

Prevalence: Common in Lithuania

Life Span: One hundred years if grown from seeding, 60-80 years if sprouted from an older tree. The shorter life of the latter is due to rotting of the wood in the original tree. Growth is rapid.

Description: Forms a light crown with broad, heart-shaped leaves which tremble at the slightest breeze. The leaves are lusterless and have fine-toothed edges. The trunk gradually tapers toward the top. The bark has a smooth greenish-gray texture on the upper portion of the trunk; toward the base of older trees it becomes rough, thick, and chalky with perpendicular furrows.

Maturity: 15-20 years

Pollination: Every year. The seeds are small and carried in a cotton-like bundle. They are widely distributed by the wind.

Reforestation Properties: Excellent. The tree is a pioneer because of the wide distribution of its seeds. In addition, the root system develops very strongly and roots may remain alive beneath the earth's surface for as much as 100 years after cutting.(5) When old Norway spruce forests are cut, the areas may be quickly reforested by European aspen sprouts from live roots beneath the surface. About 95% of European aspen in Lithuania are of sprout origin.

Enemies: The tree is intolerant to shade and forms light, thin stands providing an opportunity for other trees to take root (particularly Norway spruce). Soil quality is important. The tree grows best on loamy soils. Freezing spring temperatures do not harm it. Resistant to insects but subject to rot.

Wood: White and light weight. Not particularly durable if unprotected from moisture. Used principally for match wood. Has minor uses for light boards and for wagon parts. Its usefulness for fuel is slight. Considered a forest weed until 1918 when match production became important.

7. Type: Hoary Alder

Height: Usually 10-12 meters, occasionally to 20 meters.

Diameter of Trunk: To 30 cm.

Prevalence: Common in Lithuania.

Life Span: 50-60 years.

Description: Trunk tapers very sharply from bottom to top. The crown is light.

Maturity: Similar to the Northern Alder (see Paragraph 3).

Pollination: Similar to the Northern Alder (see Paragraph 3).

Reforestation Properties: Far less able to grow from sprouts than is the Northern Alder, but a pioneer tree. Resistant to frosts, insects, and rot. More tolerant to shade than the Northern Alder and will sometimes form undergrowth in light stands of other trees (particularly pine). Needs better soil and avoids poor, sandy areas.

Wood: White and light weight. It has no value, even as fuel. The roots enrich the soil with nitrogen, as do the roots of the Northern Alder, and both trees are planted temporarily on bad soils between pine for their fertilization properties.

D. Types of Forest Formations

1. Lithuanian forests have been badly used since ancient times, and bear many scars. Generally they now cover only lands unsuitable for farming but even these few survivors of the previous virgin forests have been cut-over many times and severely damaged by fire. There are few pine forest areas, for example, which have not been burned over. The spruce forests have suffered severe insect damage and uprooting. While the question of forest types has been discussed in Lithuania since the late 1930s, any conclusions are questionable.(6) It is very difficult to determine the real, natural forest types of Lithuania, especially in those areas which were formerly under control of the landed aristocracy or of the peasants. The ideas of the Russian school of forest typology were applied to Lithuanian forests in the 1930s when plans for forest administration were prepared. The large Rudniki forest is the only one in which Lithuanian forest typology can now be studied, because in it the stands are most closely related to the climax forests.(7) This area was under Polish Forestry Administration control until 1939. It had been a royal forest and was not utilized in any way until the first Russian occupation in 1795. Following that year, the Russians used the forest very extensively until the end of the 19th Century. The forest is mainly of pine. The stands have suffered much fire damage but the forest still remains as the closest example of what natural forest cover in Lithuania would be.(8)

2. Classified according to soil type, soil fertility, and soil drainage main Lithuanian forest types include such permanent forests as:(9)

   (a) Pine - Pineta forests originally on sterile sands and sandy loams of low fertility in dry or well drained areas except for one special type which grew in mossy, peat areas;

(b) Spruce - Piceta forests on loams and clays in well and moderately drained areas;

(c) Alder - Alneta forests on fresh, moist soils with unvarying fertility.

3. These three main types can be further divided into arid, fresh, and moist sub-types as follows:

(a) Pineta

(1) Arid Types

Dominant - Scotch pine

Associate -

Shrubs - Common Juniper
The range of this type covers the alluvial terraces of the rivers in sterile, dry sands. The type is mainly found in eastern Lithuania (Alytus and Seinai counties). At the age of 120 years this type produces an average tree 19 meters high and 19.8 cm in diameter with a volume of approximately 160-200 fest meters(10) at the normal density (= 1).(11)

(2) Fresh Types

Dominant - Pine

Associate - Norway spruce
European birch
Hoary Alder (occasionally)

Shrubs - Common Juniper
Hazelnut (occasionally)

/See end of report for availability of photograph of Scotch pine of "fresh" type./ The trees of the fresh type grow on sandy or sandy loam soils which are deep and well drained but have some contact with the underlying water table. The type is mainly located in both the eastern and western uplands. Its trees compose the most valuable and productive pine forests. At an age of 120 years, the average tree is 27-31 meters tall and 35-37 cm in diameter. The volume on one hectare at normal density (= 1) is 500-600 fest meters.(11)

(3) Moist Types

Dominant - Pine

Sub-dominant - Birch
Spruce

Associate - Aspen

Shrubs - Common Juniper
Buck thorn /Rhamnus Cathartica/

The type grows on sandy humus, in areas where the ground water level is close to the surface. It is found generally in low areas bordering swamps. At 120 years of age, the average tree is 24 meters high and 28 cm in diameter. Its volume equals 285-350 fest meters per hectare.

(4) Peat Bog Pine Forests

Dominant - pine

Associate -

Shrubs - Some Common Juniper

Herbs - Labrador tea /Ledum Palustre/
Moorworth /Andromeda Polifolia/
Small cranberry /Vaccinium Oxyccocus/
Moss - Sphagnum species

The type grows on peat formations which are normally moist. These formations are usually found in valleys and hollows among hills. These pine trees are the least productive and are not even included in work plans for forestry production. At 120 years of age, the average tree is 9-12 meters high and 14 cm in diameter. Volume equals 70-120 cubic meters per hectare.

(b) Piceta

(1) Fresh Types

Dominant - Spruce

Associates - Aspen
Oak
Birch
European Mountain Ash /Sorbus Occuparia/
Elms
Sorbus (Pyrus) Occuparia

Shrubs - European fly
Spindle trees
Cornels

These types grow on deep, loamy, well aerated soils which are well drained but have some underlying ground water. They are found mainly on the hilly portions of the eastern and western uplands. These types are the most productive trees in Lithuania. At an age of 100 they reach an average height of 27 meters and a diameter of 32 cm, and normal stands have a volume of 600-650 fest meters per hectare. The associate oak forests which belong to this group sometimes have a higher volume than the spruce. /See end of report for availability of photograph of a spruce forest of the fresh type and a photograph of a young oak-spruce stand on deep loamy soils./

(2) Moist Types

Dominant - Spruce

Associates - Aspen
Pine
European ash
Oak

Shrubs - Hazelnut
Willow
Buck Thorn

This type grows on loams and loamy sands in areas where the ground water level is high, particularly in lowlands bordering swamps and in the valleys of hilly areas (Taurage, Raseiniai, Kedainiai, Panevezys Counties). At 100 years of age, the average tree is 23-25 meters tall and 28 cm in diameter. Volume per hectare is 440-500 fest meters. Among this type of tree the spruce suffers from red rot.

(c) Alneta

(1) Fresh Types

Dominant - Alder

Associate - European ash

Shrubs - European Bird Cherry /Prunus Padus/
Buck Thorn

The type grows on sandy humus or sandy loam in the areas where the ground water level is high but fluctuates (lowlands bordering swamps). The type is found particularly in the counties of Marijampole, Birzai, and Trakai. At an age of 80 years, the average tree is 20 meters high and has a diameter of 30 cm. The volume per hectare reaches 500 fest meters.

(2) Moist Types

Dominant - Alder

Associates -

Shrubs -

The type grows in small humus deposits located near swamps or in depressions where water is occasionally present (melting snow in spring or stagnant pools). Production equals 100-120 fest meters per hectare. The average tree at 80 years of age is 13 meters high and 12 cm in diameter. It is used mainly for fuel.

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FOOTNOTES - CHAPTER II

(1) Bolshaya Sovietskaya Encyclopedia, 1955, Vol 25, p 248-250

(2) Hammond's Ambassador World Atlas, p 28

(3) Bolshaya Encyclopedia, Vol 25, p 614

(4) Rauktys, J, "Pastabos Apie Lietuvos Augalija", 1945, p 181

(5) Morosov, "Uchenie o Lese", Aspen, 1932

(6) Matulionis, P, "Kiek Girioje Medziu Kirstina", 1924

Regel, K, "Lietuvos Misku Tipai, Musugirios, 1932

Buteikis, P, "Alneta Grupe Kazlu Rudos Miskuose", Musu Girios, 1938, p 401

Jankauskas, M, "Del Lietuvos Misku Tipai", Musu Girios, 1935, p -

Vileinskos, J, "Medynu Tipai Kazlu Rudos Miskuose", Musu Girios, 1933, p 245

Jankauskas, "Padubysio Girios Medynu Tipai", Musu Girios, 1938

(7) Author's opinion

(8) Miklaszewski, J, "Lasy i. Lesnietwo w Polsce", 1927

(9) The types given are not definite and should be considered only as a sketch based on the author's opinion.

(10) A cubic meter used in measuring rough timber (trunks with the bark remaining, etc).

(11) The productivity estimates given are only approximate and frequently fall below the figures given.